Regulating the use of Stormwater Infiltration Practices to Protect Public Drinking Water Supplies in Massachusetts

Small MS4 Permit Technical Support Document, April 2011

Why is Stormwater Infiltration a Potential Concern?

Site design techniques and best management practices (BMPs) that promote infiltration rather than surface runoff are often the preferred approach to stormwater management. Infiltration BMPs (e.g., infiltration basins) and low impact development techniques (e.g., rain gardens and permeable pavement) can increase recharge to groundwater aquifers and maintain baseflow to streams and rivers. However, because infiltrated stormwater can contain a wide variety of contaminants, the potential impacts to groundwater must be evaluated on a case-by-case basis. Depending on local conditions, infiltration without pretreatment may not be appropriate or allowed in areas where groundwater is a source of drinking water or in other designated sensitive areas, such as aquifers overlain with thin porous soils.

In Massachusetts, some stormwater infiltration BMPs may be subject to additional requirements of the Underground Injection Control (UIC) Program, Drinking Water Protection Program, Ground Water Discharge Program, and the Massachusetts Stormwater Management Standards (MASWMS).

If you are infiltrating stormwater, you must observe required setbacks from water supplies and follow MASWMS design standards. You may also be required to register your BMP as a Class V Underground Injection Wells with MA DEP.

How Are Stormwater Infiltration BMPs Regulated under the Massachusetts Underground Injection Control (UIC) Program?

Infiltration BMPs are regulated as Class V underground injection wells "used to drain stormwater runoff" if they meet any of the following criteria defining a well by Massachusetts UIC regulations (310 CMR 27.02):

1. a bored, drilled, or driven shaft, a dug hole, or seepage pit whose depth is greater than its largest surface dimension; or,
2. an improved sinkhole; or,
3. any subsurface structure that has a soil absorption system (SAS) with a subsurface fluid distribution line and aggregate. ***Note: This refers to subsurface infiltration enhancement systems, but does not include underdrains designed to collect and convey stormwater to a surface outfall or to a storm drain network.***

The Massachusetts UIC regulations (310 CMR 27.04(3)) prohibit the injection of "*any fluid into a Class V well where that injection may cause or allow the movement of any fluid containing any pollutant into underground sources of drinking water and the presence of that pollutant causes or is likely to cause a violation of the Massachusetts Drinking Water Regulations, or which in the opinion of the Department adversely affects or may adversely affect the health of persons.*"

Which BMPs May Classify as Class V Wells?

A) Dry wells and **leaching catch basins** will always qualify as Class V wells because they are deeper than they are wide/long.

B) Permeable pavements designed to exfiltrate are not classified as Class V wells because their length or width is greater than their depth unless they have a piped distribution system below grade to provide further infiltration.

C) Infiltration basins and **trenches** generally are not considered Class V wells unless they have distribution systems to provide further infiltration at or below the base of the trench/basin, contain dry wells, or are deeper than they are longer/wider.

D) Underground storage chambers designed primarily to infiltrate stormwater into the ground are classified as Class V wells. Underground chambers used solely for detention that then discharge to a wetland resource area, storm drain, or surface water reuse system are generally not Class V wells.

E) Bioretention, **bioswales**, or other filtering practices with under drains discharging to an outlet structure are generally not classified as Class V wells.

What's the Difference between Distribution and Collection Lines?

Distribution lines as part of a SAS are designed to distribute flow evenly and/or convey to a subsurface discharge location. An example is a subsurface chamber system that stores runoff for ultimate recharge. These must be registered as Class V wells. A collection line, such as an underdrain below a bioretention filter media, is designed to drain saturated soils and reduce the drawdown time for standing surface water. If the underdrain conveys flows to an outlet structure that discharges to a surface outlet or off-site into a storm drain network, then this collection system would generally not meet the criteria of a Class V well.

Soil Absorption System *(310 CMR 27.02): a system of trenches, galleries, chambers, pits, field(s), or bed(s) together with effluent distributions lines and aggregate which is installed in appropriate soils to receive and distribute fluids below the surface of the ground.*

What are the Additional BMP Siting and Design Requirements near Public Drinking Water Supplies?

Massachusetts Drinking Water Regulation 310 CMR 22.07 defines five recharge protection areas/zones for ground water and surface public water supplies. Where and how stormwater can be infiltrated within these protection areas/zones is outlined in MASWMS Vol. 1 and summarized in Table 1.

Table 1. Stormwater Infiltration Requirements for Discharges Near Public Drinking Water Supplies.

Protection Zones	Infiltration BMPs
Wellhead Protection Area (WPA) Zone I—land area within a 400-ft. wellhead radius (assumes >100,000 gpd withdrawal rate).	Prohibited unless essential to the operation of a public water supply facility.
Wellhead Protection Area (WPA) Zone II—entire extent of the aquifer deposits that could fall within, and upgradient from, the production well's capture zone based on the predicted drawdown after 180-day drought conditions at the approved pumping rate.	Allowed with additional pretreatment to remove at least 44% of TSS (80% removal at end of treatment train). Runoff from non-metal roofs is excluded from the pretreatment requirement.
Interim Wellhead Protection Area (IWPA) —area within a half mile radius around a public supply well that does not have a MA DEP approved delineated Zone II.	
Surface Water Supply Zone A—land areas within 400 ft around a Class A surface drinking water source and the land within 200 ft around tributaries to that drinking water source.	Prohibited unless essential to the operation of a public water supply facility.

Unless essential to the operation of a public water supply facility, stormwater infiltration BMPs are prohibited within Zone A of public surface water supplies (SWS) and Zone I of public groundwater supplies (GWS). Infiltration BMPs are allowed in GWS Zone II and IWPA, but 44% of TSS must be removed from stormwater prior to discharging into an infiltration BMP. This TSS pretreatment requirement can be met with the following approved devices: deep sump catch basins, oil/grit separators, proprietary separators, sediment forebay, and vegetated filter strips as listed in MASWMS. Proprietary devices may be used for pretreatment in SWS Zone B and GWS Zone II and IWPA, but the specific TSS removal amount needs to be determined (see MASWMS Vol. 2, Ch. 4 and Massachusetts Stormwater Technology Evaluation Project (www.mastep.net)).

Where Total Maximum Daily Loads (TMDLs) have been established, treatment must be provided for both TSS and TMDL constituent(s). For land uses with higher potential pollutant loads, additional source control and pollution prevention actions shall be implemented in accordance with the MASWMS, though these types of land uses typically are prohibited near drinking water supplies by local source water protection zoning bylaws. Additional siting and design standards for infiltration practices described in MASWMS Vol. 2 for TSS removal include:

- Minimum soil infiltration rate of 0.17 inches/hr; soil type and composition standards; and number of required soil borings;
- A 2-ft minimum separation distance from seasonal high groundwater elevation (SHGW); and
- Minimum setback distances from drinking water supplies and other features (Table 2).

Table 2. Setbacks for Infiltration Practices (per MASWMS, Vol. 2 criteria for infiltration trenches)

Feature	Minimum Setback Distance
Public Groundwater Supply (WPA)	Zone I wellhead radius (400 ft), with additional distance depending on hydrogeological conditions
Public Surface Water Supply and tributaries	Outside of Zone A (400 ft for reservoir and 200 ft for tributaries
Private Well	100 ft, with additional distance depending on hydrogeological conditions and infiltration BMP.
Any surface water (other than drinking water supplies and their tributaries)	50 ft (Infiltration-specific setbacks may apply).
Septic systems	50 ft.
Building foundations (e.g., basements & slabs)	20 ft (Infiltration-specific setbacks may apply).
Slope greater than 5%	100 ft to any exposed surface trench
Slope greater than 20%	100 ft to any underground trench

In addition to these regulations, compliance with local source water protection ordinances, bylaws, and regulations is also required. Conservative design practices to remove nutrient or pathogens are advised, such as at least a 4-foot separation to SHGW.

How Can I Determine the Location of Public Drinking Water Protection Areas?

The locations of specific wellhead protection areas and surface water supplies can be found using the MassGIS Water Supply Protection Area Interactive Viewer at http://maps.massgis.state.ma.us/WSPA/viewer.htm (Figure 1).

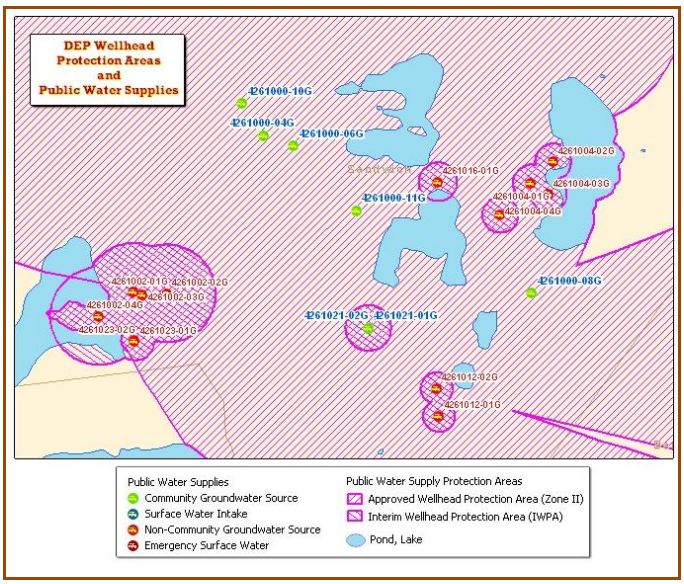

Figure 1. Example of MassGIS map showing location of community and non-community water supply wells and associated Zone II and IWPA wellhead protection areas.

What Actions are needed for Stormwater Discharges Regulated to the UIC Program?

Massachusetts UIC requirements may be more stringent than the minimum U.S. EPA criteria to protect public drinking waters and groundwaters. If you are unsure whether or not your stormwater BMP is considered a Class V underground injection well, you may contact the Massachusetts Department of Environmental Protection (MassDEP) UIC Program directly.

If you are the owner or operator of an existing (or proposed) stormwater infiltration device meeting the definition of a Class V underground injection well, you must register with the MassDEP UIC Program as established in the Massachusetts Underground Injection Control Regulations (310 CMR 27.00) and Massachusetts Groundwater Discharge Permit Regulations (314 CMR 5.00) and the MASWMS.

Registration information can be found on the MassDEP website at: www.mass.gov/dep/water/drinking/uic.htm. An on-line registration filing system is in the process of development. Contact MassDEP at 617-292-5859 if you have any questions.

Exempted from the UIC registration requirements are:

- Permitted Title V on-site subsurface sewage disposal systems (31 0 CM R 1 5.00);
- Permittees operating under approved Groundwater Discharge Permits (310 CMR 5.00); and
- Groundwater remediation projects performed in accordance with the Massachusetts Contingency Plan (310 CMR 40.00 and M.G.L. c. 21E).

Additional information on the minimum requirements for operators of Class V wells can be found at: http://water.epa.gov/type/groundwater/uic/class5/complyminrequirements.cfm

For More Information

Massachusetts Drinking Water Source Protection Program:
www.mass.gov/dep/water/drinking/systems.htm

Massachusetts Stormwater Program: Stormwater Handbook:
www.mass.gov/dep/water/laws/policies.htm

EPA UIC Factsheet: "When Are Stormwater Discharges Regulated As Class V Wells?"
www.epa.gov/ogwdw000/uic/class5/pdf/fs_uic-class5_classvstudy_fs_storm.pdf

EPA Office of Water Memorandum "Clarification on which stormwater infiltration practices/ technologies have the potential to be regulated as "Class V wells by the Underground Injection Control Program," June 13, 2008.
www.epa.gov/npdes/pubs/memo_gi_classvwells.pdf

Code of Federal Regulations (CFR) – Chapter 40 Part 144-Subpart G--Requirements for Owners and Operators of Class V Injection Wells, Section 144.81